

**1996 NEOTROPICAL MIGRATORY BIRD SURVEYS**  
*Gates of the Arctic National Park and Preserve*

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## INTRODUCTION

Most of the avian species found in Gates of the Arctic National Park and Preserve are neotropical migrants, wintering in the southern United States, the tropics, and South America. Several species, such as the bluethroat and northern wheatear, migrate to Asia and North Africa. Migrating birds are facing widespread loss of habitat in critical feeding and staging areas along migration routes and in wintering areas. Pesticides and herbicides constitute additional threats to migrating birds, particularly those wintering in third world countries. Impacts of these threats on neotropical migrant bird populations may be detected first through changes in bird abundance, distribution, and reproductive success on the breeding grounds.

In 1993, Boreal Partners in Flight coordinated a 3-year pilot program using off-road point counts to monitor bird species abundance in Alaska. As part of this program, resource management staff established 3 off-road point count routes within the park. Goals for this project are to: (1) identify resident or breeding bird species in 3 distinct areas of the park; (2) collect baseline information on bird species abundance in these 3 areas; and (3) obtain habitat use information for bird species in these areas. The 1996 off-road point count bird survey was the fourth year of this ongoing project.

## STUDY AREA

Gates of the Arctic National Park and Preserve is located above the Arctic Circle ( $66^{\circ} 33' \text{ N}$  latitude) in the central Brooks Range, Alaska, (Fig. 1). Two climate zones occur in the park and preserve: the subarctic zone at lower elevations south of the continental divide and the arctic zone to the north and at high elevations. Precipitation is low within the park and preserve and yearly averages fall between 30 - 45 cm in the west and 13 - 25 cm in the north (National Park Service 1986). Snowfall averages south of the divide range between 152 - 203 cm and averages of 89 - 127 cm are typical in the north. Yearly temperatures in the south fluctuate from an average July maximum of  $21^{\circ} \text{ C}$  ( $70^{\circ} \text{ F}$ ) to an average January minimum of  $-34^{\circ} \text{ C}$  ( $-30^{\circ} \text{ F}$ ). Temperatures in the north fluctuate from an average July maximum of  $18^{\circ} \text{ C}$  ( $65^{\circ} \text{ F}$ ) to an average February minimum of  $-23^{\circ} \text{ C}$  ( $-10^{\circ} \text{ F}$ ).

Boreal forest, tundra, and shrub thicket are the major vegetation communities in the park and preserve (National Park Service 1986). Boreal forest covers the southern flanks and valleys of the Brooks Range and is composed of black spruce (*Picea mariana*), white spruce (*P. glauca*), paper birch (*Betula papyrifera*), aspen (*Populus tremuloides*), and balsam poplar (*Populus balsamifera*). Tall dense willow (*Salix* spp.)/alder (*Alnus* spp.) thickets up to 3.5 m in height occur along stream channels and gravel bars. The Middle Fork Koyukuk off-road point count transect (Fig. 2) is located within this plant community.

Moist tundra is the predominant vegetation community on the north side of the Brooks Range. It is composed primarily of cotton sedge (*Eriophorum* spp.) and forms on moderate to poorly drained soils. Low willow thickets line stream channels and low-lying areas in the northern tundra areas, but willow thickets up to 3 m in height occur along stream channels in the western tundra areas. The Anaktuvuk Pass and Pingo Lake off-road point count transects (Fig. 2) are located within this vegetation community.

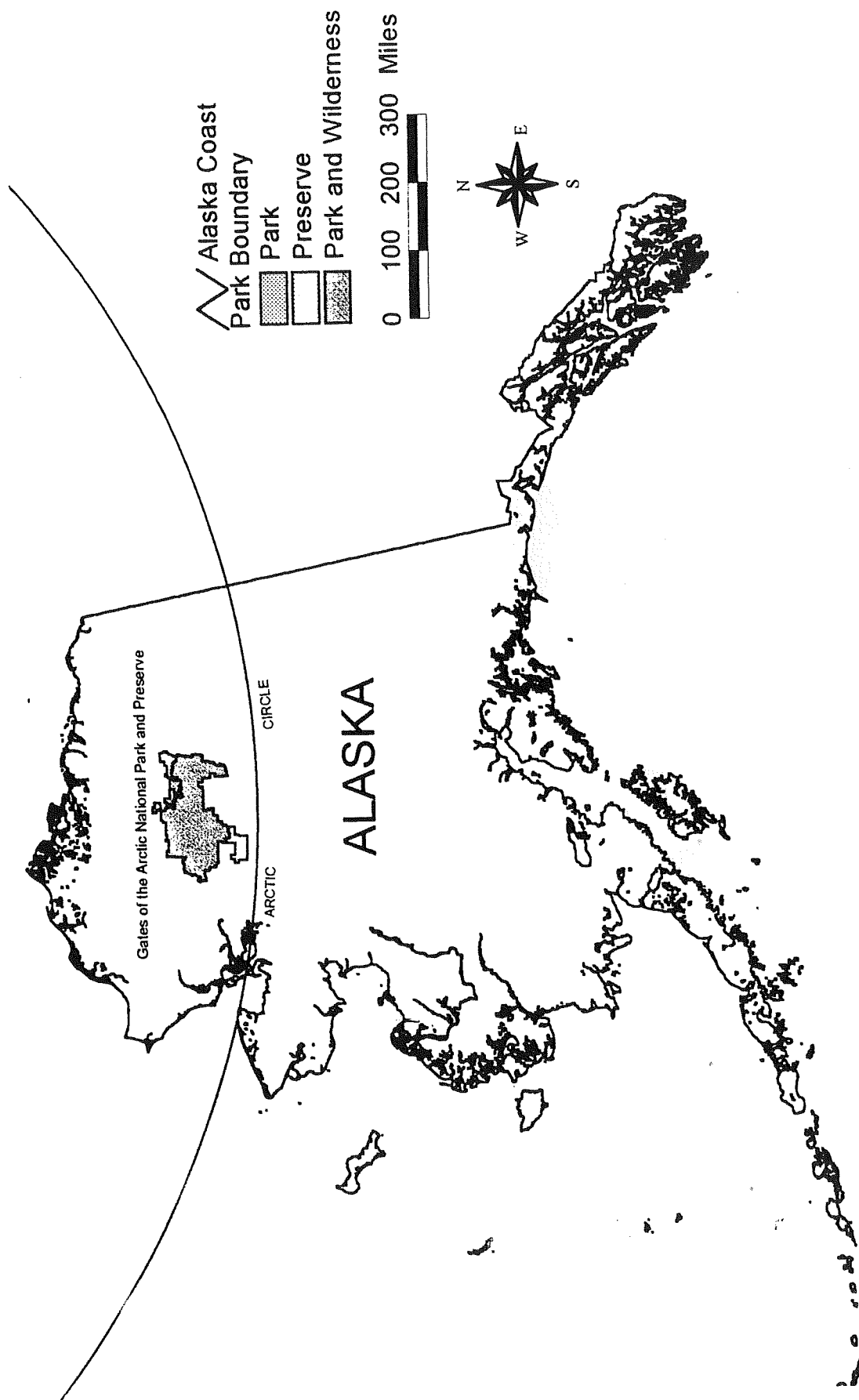


Fig. 1. Gates of the Arctic National Park and Preserve, located in the central Brooks Range north of the Arctic Circle.

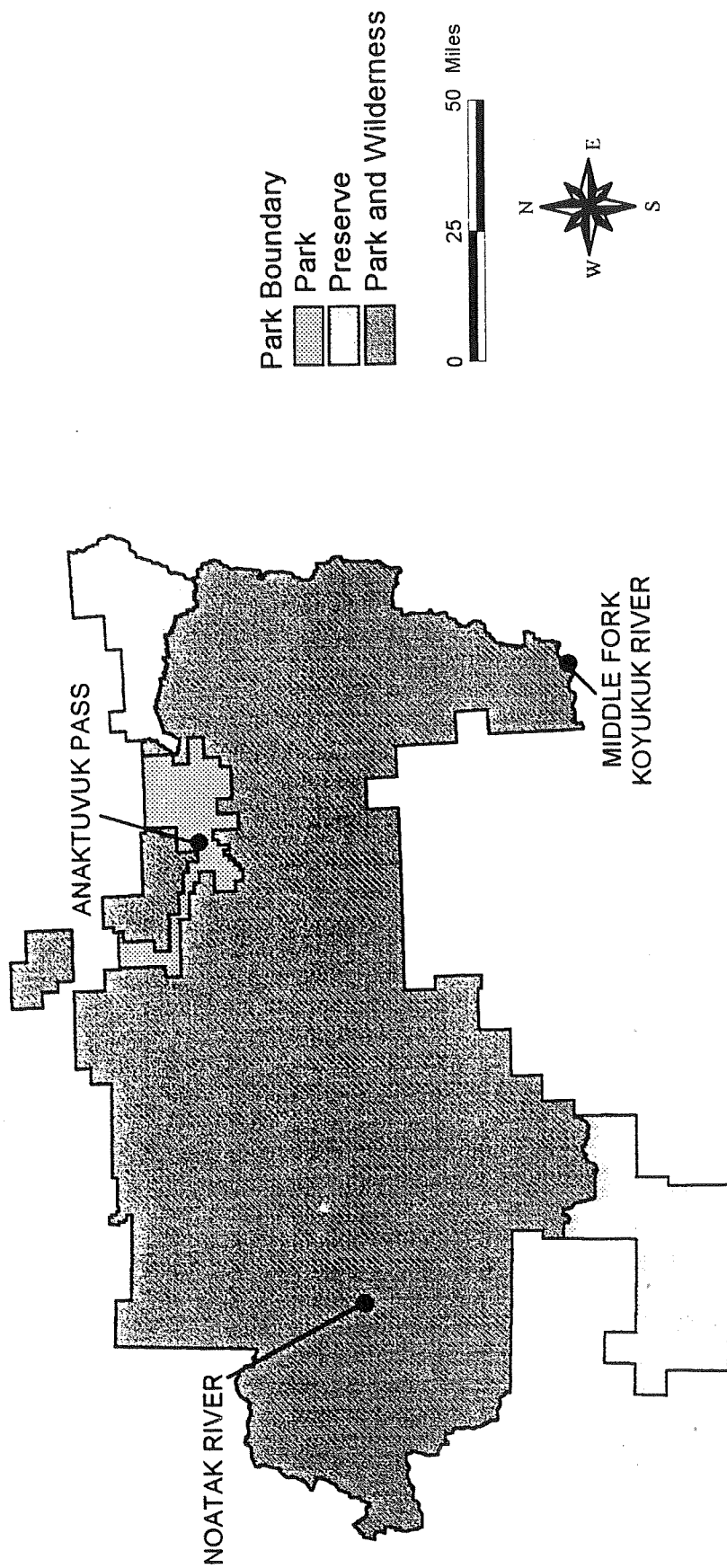


Fig. 2. Locations of 3 off-road point count bird survey routes in Gates of the Arctic National Park and Preserve, Alaska, 1996.

## METHODS

Off-road point count transects consisting of 12 points each were established in 1993 in 3 areas of the park and preserve: the Middle Fork Koyukuk River, Pingo Lake on the Noatak River, and Anaktuvuk Pass (Fig. 2). Point count sites within each transect were separated by >200 m in treed habitat and >400 m on tundra and along the river. The Middle Fork Koyukuk River transect was completed by canoe and the Anaktuvuk and Pingo Lake transects were traversed on foot. Surveys were conducted 11-20 June 1996, starting at 0330-0400 h and finishing by 0730 h. All birds identified by song or sight during a 5-minute interval at each point were identified and mapped according to their location and distance from the point. Methodology follows that modified from Ralph et al. (1993) by the Alaska Chapter of Boreal Partners in Flight (1994).

## RESULTS AND DISCUSSION

A total of 36 bird species were detected during the 1996 off-road point counts on the Middle Fork Koyukuk River, Pingo Lake and Anaktuvuk Pass routes. The greatest species diversity was found along the Middle Fork point count with twenty species recorded (Table 1). The Pingo Lake count produced the greatest abundance of birds with a total of 147 recorded of 18 species (compared to 101 individuals recorded on the Middle Fork route) (Table 2). At Anaktuvuk Pass, with just 10 species recorded, a total of 88 birds were counted (Table 3). Species which had not been recorded on previous off-road point counts in Gates of the Arctic include: Violet-green Swallow on the Middle Fork survey; Red-throated Loon and Say's Phoebe on the Pingo Lake survey; and Common Merganser on the Anaktuvuk Pass survey. Several species were common to more than one survey area (Table 4).

An additional 31 species were observed in the survey areas at times other than during the recording intervals, resulting in a total of 67 bird species observed. Species diversity roughly doubled in all survey areas when these other observations were included (Table 4). Recording all species seen or heard in the study area--rather than just during the point count--is especially important for our primary goal of documenting species diversity in the park. Sometimes uncommon or unexpected species are recorded in this way. For example, a Bluethroat was seen and heard several times near our camp in Anaktuvuk Pass but was never recorded at any of the points. Also, a Northern Flicker was unexpectedly discovered near the Pingo Lake transect. This cavity-nesting bird, normally associated with large trees, was found in a small grove of dwarf balsam poplars. None of the trees looked bigger than about 6" in diameter at the largest. A nest search in this area may reveal some interesting facts about this species' breeding ecology.

The study areas differed not only in overall diversity and abundance, but also in individual species abundance (Tables 1-3, Fig. 3). The three most abundant species on the Middle Fork route, Swainson's Thrush, White-winged Crossbill and Ruby-crowned Kinglet, were not even recorded in the other two study areas. Habitat most likely plays the largest role in this discrepancy, as these species are forest dwellers. While the Middle Fork route is forested, the Pingo Lake and Anaktuvuk Pass routes are unforested, shrubby tundra areas. (Tables 5-7.) The American Tree Sparrow, although not recorded in the Middle Fork count, was ubiquitous on the Pingo Lake survey and was recorded at all but one point along the Anaktuvuk Pass route, becoming the most abundant species (55 individuals) recorded in all surveys combined. White-crowned Sparrows were a close second in abundance (54 individuals), being present in all three surveys. Both of these sparrows were present in all vegetation types on the Pingo Lake and Anaktuvuk Pass areas, and White-crowned Sparrows were also present in most of the Middle

Table 1. Bird species diversity and abundance on the Middle Fork Koyukuk River off-road point count, Gates of the Arctic National Park and Preserve, Alaska, 11 June 1996.

SPECIES	#RECORDED	SPECIES	#RECORDED
<u>Canada Goose</u>	1	<u>Varied Thrush</u>	2
<u>Northern Goshawk</u>	1	<u>Yellow-rumped Warbler</u>	6
<u>Spotted Sandpiper</u>	3	<u>Orange-crowned Warbler</u>	1
<u>Olive-sided Flycatcher</u>	1	<u>Northern Waterthrush</u>	3
<u>Alder Flycatcher</u>	1	<u>Wilson's Warbler</u>	7
<u>Violet-green Swallow</u>	4	<u>Fox Sparrow</u>	1
<u>Bank Swallow</u>	8	<u>White-crowned Sparrow</u>	7
<u>Ruby-crowned Kinglet</u>	9	<u>Slate-colored Junco</u>	5
<u>Gray-cheeked Thrush</u>	5	<u>White-winged Crossbill</u>	10
<u>Swainson's Thrush</u>	23	<u>Common Redpoll</u>	3
Total number of species recorded:		20	
Total number of birds recorded:		101	

Table 2. Bird species diversity and abundance on the Pingo Lake off-road point count, Gates of the Arctic National Park and Preserve, Alaska, 15 June 1996.

SPECIES	#RECORDED	SPECIES	#RECORDED
<u>Red-throated Loon</u>	1	<u>Say's Phoebe</u>	1
<u>Northern Shoveler</u>	2	<u>Gray-cheeked Thrush</u>	12
<u>Lesser Scaup</u>	3	<u>American Robin</u>	6
<u>Lesser Yellowlegs</u>	4	<u>Orange-crowned Warbler</u>	21
<u>Upland Sandpiper</u>	2	<u>American Tree Sparrow</u>	38
<u>Common Snipe</u>	1	<u>Savannah Sparrow</u>	10
<u>Red-necked Phalarope</u>	1	<u>White-crowned Sparrow</u>	27
<u>Mew Gull</u>	4	<u>Common Redpoll</u>	12
<u>Arctic Tern</u>	1	<u>Smith's Longspur</u>	1
Total number of species recorded:		18	
Total number of birds recorded:		147	

Table 3. Bird species diversity and abundance on the Anaktuvuk Pass off-road point count, Gates of the Arctic National Park and Preserve, Alaska, 20 June 1996.

SPECIES	#RECORDED	SPECIES	#RECORDED
<u>Lesser Scaup</u>	2	<u>American Tree Sparrow</u>	17
<u>Common Merganser</u>	2	<u>White-crowned Sparrow</u>	20
<u>Long-tailed Jaeger</u>	1	<u>Savannah Sparrow</u>	18
<u>Common Snipe</u>	1	<u>Common Redpoll</u>	19
<u>American Robin</u>	3	<u>Lapland Longspur</u>	5
Total number of species recorded:		10	
Total number of birds recorded:		88	

Table 4. All bird species observed during the 1996 off-road point count surveys in Gates of the Arctic National Park and Preserve, Alaska, 11-20 June 1996. Species not officially recorded during the point count time intervals are in ( ).

SPECIES	MIDDLE FORK	PINGO LAKE	ANAKTUVUK PASS
<u>Canada Goose</u>	✓		
<u>Bald Eagle</u>	(✓)		
<u>Northern Goshawk</u>	✓		
<u>Red-tailed Hawk</u>	(✓)		
<u>American Kestrel</u>	(✓)		
<u>Merlin</u>	(✓)		
<u>Peregrine Falcon</u>	(✓)		
<u>Spotted Sandpiper</u>	✓		
<u>Great Horned Owl</u>	(✓)		
<u>Belted Kingfisher</u>	(✓)		
<u>Olive sided Flycatcher</u>	✓		
<u>Alder Flycatcher</u>	✓		
<u>Violet-green Swallow</u>	✓		
<u>Gray Jay</u>	(✓)		
<u>Black-capped Chickadee</u>	(✓)		
<u>Boreal Chickadee</u>	(✓)		
<u>Ruby-crowned Kinglet</u>	✓		
<u>Swainson's Thrush</u>	✓		
<u>Varied Thrush</u>	✓		
<u>Yellow Warbler</u>	(✓)		
<u>Yellow-rumped Warbler</u>	✓		
<u>Blackpoll Warbler</u>	(✓)		

Table 4, cont'd.

SPECIES	MIDDLE FORK	PINGO LAKE	ANAKTUVUK PASS
<u>Northern Waterthrush</u>	✓		
<u>Slate-colored Junco</u>	✓		
<u>White-winged Crossbill</u>	(S)		(S)
<u>Glaucous Gull</u>	(S)		(S)
<u>Wilson's Warbler</u>	✓		(S)
<u>Fox Sparrow</u>	(S)		✓
<u>Common Merganser</u>	(S)	(S)	
<u>American Wigeon</u>	(S)	✓	
<u>Lesser Yellowlegs</u>	(S)	(S)	
<u>Golden Eagle</u>	(S)	✓	
<u>Mew Gull</u>	✓	(S)	
<u>Bank Swallow</u>	✓	✓	
<u>Gray-cheeked Thrush</u>	(S)	(S)	(S)
<u>Common Raven</u>	(S)	✓	✓
<u>American Robin</u>	(S)	✓	(S)
<u>Orange-crowned Warbler</u>	✓	✓	✓
<u>American Tree Sparrow</u>	(S)	✓	✓
<u>Savannah Sparrow</u>	(S)	✓	✓
<u>White-crowned Sparrow</u>	✓	✓	✓
<u>Common Redpoll</u>		(S)	(S)
<u>Tundra Swan</u>		✓	
<u>Red-throated Loon</u>		(S)	
<u>Horned Grebe</u>		(S)	
<u>Canvasback</u>		(S)	
<u>Oldsquaw</u>		(S)	
<u>Northern Shoveler</u>		(S)	
<u>White-winged Scoter</u>		✓	
<u>Upland Sandpiper</u>		✓	
<u>Red-necked Phalarope</u>		(S)	
<u>Northern Harrier</u>		(S)	
<u>Sharp-shinned Hawk</u>		(S)	
<u>Bonapart's Gull</u>		✓	
<u>Arctic Tern</u>		(S)	
<u>Northern Flicker</u>		✓	
<u>Say's Phoebe</u>		(S)	
<u>Northern Shrike</u>		✓	
<u>Smith's Longspur</u>		✓	✓
<u>Lesser Scaup</u>		✓	✓
<u>Common Snipe</u>			(S)
<u>Green-winged Teal</u>			(S)
<u>American Golden Plover</u>			✓
<u>Long-tailed Jaeger</u>			(S)
<u>Bluethroat</u>			(S)
<u>Northern Wheatear</u>			✓
<u>Lapland Longspur</u>			
<b>TOTAL # BIRD SPECIES</b>	<b>42</b>	<b>32</b>	<b>20</b>



Fork habitats. Orange-crowned Warblers were also abundant on the Pingo Lake survey. This route has a greater proportion of shrubby-meadow areas than what is found on the Anaktuvuk Pass route; warblers in general favor this type of habitat for nesting, which may explain their greater abundance in the Pingo Lake area. Other species recorded in abundance, particularly in the Anaktuvuk Pass survey, were Common Redpolls and Savannah Sparrows. These two species tend to prefer more open areas, the Common Redpoll breeding in drier, rocky tundra and the Savannah Sparrow preferring wetter tundra (Ehrlich et al. 1988). Both of these habitat types are common in the Anaktuvuk Pass area.

The 1996 off-road point count bird surveys were conducted in a different order than during the past 3 years. Previously, the Anaktuvuk route had been surveyed first, the Middle Fork route last. This year, however, these two were switched, the logic being that the birds would most likely reach the more southerly areas first and progress north. The concern was that the breeding season may advanced far enough that many birds would stop singing by the time the Middle Fork was surveyed. There was also concern that June 10<sup>th</sup> may still be too early in Anaktuvuk Pass (at a approximately 68°08'N latitude) to catch the height of the singing period. Comparing this year's results with the previous three years' data, however, reveals nothing extraordinary in terms of species diversity about timing of the surveys (Table 8). In fact, the 1996 point count recorded the lowest species diversity of any year thus far on the Anaktuvuk Pass route; species diversity on the 1996 Middle Fork Koyukuk survey was also lower than average.

What may play the largest role in the "success" of the bird surveys--recording the actual species diversity and abundance in the study areas--probably depends less on the order of when the three routes are surveyed than on the annual variation in the onset of spring and the weather at the time of each survey. Every year is different. Because of this unpredictability in weather and the arrival of the birds on the breeding grounds, it is important to continue monitoring avian diversity, abundance, and habitat use, while building a database to detect any trends that may be occurring in the bird populations.

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Table 5. Vegetation types associated with bird species during off-road point count survey on the Middle Fork Koyukuk River, Gates of the Arctic National Park and Preserve, Alaska, 15 June 1996. Vegetation classification follows Viereck et al (1992).

SPECIES	OPEN BROADLEAF FOREST	OPEN NEEDLE-LEAF FOREST	OPEN MIXED FOREST	CLOSED NEEDLE- LEAF FOREST	OPEN/CLOSED NEEDLE-LEAF FOREST	BROAD-LEAF WOOD-LAND	NEEDLE- LEAF WOOD- LAND
Canada Goose	✓				✓		
Northern Goshawk	✓	✓		✓			
Spotted Sandpiper	✓						
Olive-sided Flycatcher	✓						
Alder Flycatcher	✓						
Violet-green Swallow	✓	✓	✓				
Bank Swallow	✓	✓	✓	✓			✓
Ruby-crowned Kinglet	✓	✓	✓	✓		✓	✓
Gray-cheeked Thrush	✓	✓	✓				
Swainson's Thrush	✓	✓	✓				
Varied Thrush	✓	✓	✓		✓		
Yellow-rumped Warbler	✓	✓	✓				
Orange-crowned Warbler		✓	✓		✓	✓	
Northern Waterthrush		✓			✓		
Wilson's Warbler	✓		✓				✓
Fox Sparrow	✓	✓	✓		✓		
White-crowned Sparrow	✓	✓	✓	✓			✓
Slate-colored Junco	✓		✓	✓			
White-winged Crossbill		✓	✓			✓	
Common Redpoll		✓	✓				

Table 6. Vegetation types associated with bird species during off-road point count survey near Pingo Lake, Gates of the Arctic National Park and Preserve, Alaska, 15 June 1996. Vegetation classification follows Viereck et al (1992).

SPECIES	MESIC GRAMINOID HERBACIOUS	OPEN TALL SCRUB	OPEN LOW SCRUB	DRYAS DWARF SCRUB
Red-throated Loon			✓	
Northern Shoveler			✓	
Lesser Scaup			✓	
Lesser Yellowlegs	✓	✓	✓	
Upland Sandpiper	✓		✓	
Common Snipe			✓	
Rednecked Phalarope	✓		✓	
Mew Gull	✓			
Arctic Tern	✓			
Say's Phoebe	✓		✓	
Gray-cheeked Thrush	✓	✓	✓	
American Robin	✓	✓	✓	
Orange-crowned Warbler	✓	✓	✓	✓
American Tree Sparrow	✓	✓	✓	✓
Savannah Sparrow	✓	✓	✓	✓
White-crowned Sparrow	✓	✓	✓	✓
Common Redpoll	✓			
Smith's Longspur	✓			

Table 7. Vegetation types associated with bird species during off-road point count survey near Anaktuvuk Pass, Gates of the Arctic National Park and Preserve, Alaska, 20 June 1996. Vegetation classification follows Viereck et al (1992).

SPECIES	DRYAS DWARF SCRUB	MESIC GRAMINOID HERBACIOUS	WET GRAMINOID HERBACIOUS	OPEN LOW SCRUB
Lesser Scaup			✓	
Common Merganser			✓	
Long-tailed Jaeger	✓			
Common Snipe	✓		✓	
American Robin	✓		✓	✓
American Tree Sparrow	✓	✓	✓	✓
White-crowned Sparrow	✓	✓	✓	
Savannah Sparrow	✓	✓		✓
Common Redpoll	✓	✓		
Lapland Longspur	✓			

Fig. 3. Abundance of selected bird species along three off-road point count routes in Gates of the Arctic National Park and Preserve, Alaska, June, 1996.

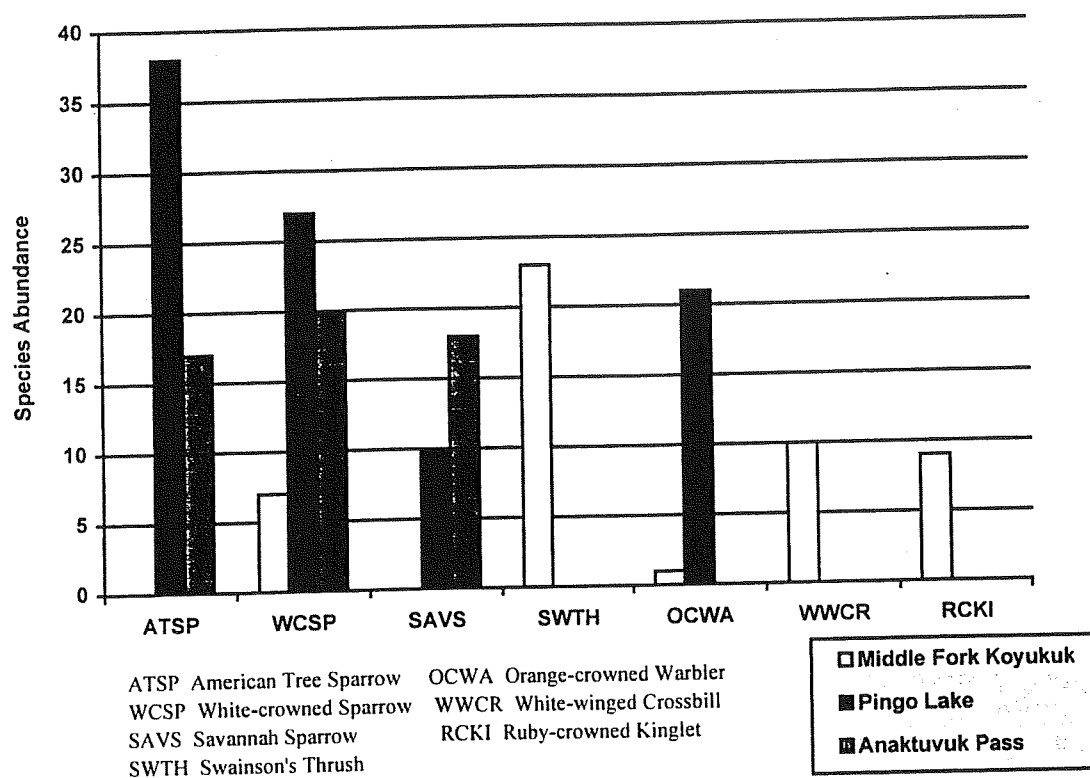


Table 8. Comparison of species diversity between years and survey routes for off-road point count bird surveys in Gates of the Arctic National Park and Preserve, Alaska.

SURVEY ROUTE	1993 DATE	1994 DATE	1995 DATE	1996 DATE
	#SPP	#SPP	#SPP	#SPP
MIDDLE FORK KOYUKUK	June 24	June 23	June 19	June 11
	27	19	25	20
PINGO LAKE	June 20	June 19	June 16	June 15
	20	16	15	18
ANAKTUVUK PASS	June 16	June 15	June 12	June 20
	15	18	15	10